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# DEEP SEISMIC SOUNDING IN THE ZONE OF TRANSITION BETWEEN THE ASIATIC CONTINENT AND THE PACIFIC OCEAN.

## THESES.

1. In order to investigate the crustal structure in the zone of transition between the Asiatic continent and the Pacific ocean, deep seismic sounding (DSS) was and is being carried out in 1957-1958 in the Okhotsk sea, in the north-west part of the Pacific adjoining the Kurile islands, on Kamchatka and the Komandor islands.

In 1957 DSS profiles were made crossing the southern part of the Okhotsk sea in the direction running from the gulf of Tiorpenie (Sakhalin) to the Kurile islands and also the Kurile trough- south-east of the islands of Iturup, Urup and Simushir. The length of the profiles in the ocean reached up to 400-600 km and the general length of all the profiles made was about 3300 km.

The DSS measurements were part of a complex of geological geophysical investigations carried out in the transition zone.

2. In the DSS observations mobile shooting points and stationary recording points were used. This technique had been first tested in 1956 in the Caspian sea.

Observations were carried out on 2 to 4 ships simultaneously, which provided complete systems of distance-time curves for the fundamental wave groups. The interval between the shooting points was about 5 km and the maximum recording distance - about 200 km. The most stable records were obtained at distances up to 100-120 km. Land observations were also carried out on the island of Iturup, around which a fan-shaped system of profiles was made extending into the Okhotsk sea and into the ocean for about 200 km.

3. The many waves picked out from the DSS records can be divided into three fundamental types: I type - head (or refracted) waves connected with the boundaries in the earth's crust; II type - different kinds of composed waves: longitudin-

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al- transversal, reflected refractions, refracted reflections, multiple waves and also waves connected with bottom sediments; III type- acoustic waves travelling through water-direct and also once and many times reflected from the sea surface and the bottom.

4. Among the waves of the I type three groups stand out which have different apparent velocities and are observed in different regions. The first group of waves with an apparent velocity of 3.5 to 7 km/sec is connected with the boundary between the sedimentary and the granitic layers. It is recorded in the Okhotsk sea and in the part of ocean between the Kurile are and the eastern part of the Kurile trough. The second group having velocities from 6 to 8 km/sec is connected with the surface of the basaltic layer and is observed universally. The third group of waves with velocities from 7 to 10 km/sec is connected with the Mohorovicic discontinuity and is also universally observed.

5. A preliminary treatment of the obtained data permits to draw a picture of the crustal structure along the lines running from South Sakhalin (the gulf of Tierpenie) - to the island of Iturup ( and the other to that of Urup) - to the Kurile trough- and the ocean bed.

An examination of this diagram shows that the thickness of the earth's crust increases in the direction of the islands of the Kurile arc and diminishes in the Okhotsk sea and in the ocean.

It thus appears that the crustal structure is different in different parts of the region under investigation: the crust under the islands consists of a thick sedimentary layer and also of a granitic and basaltic layers. According to the DSS data the granitic layer is absent in some portions of the Okhotsk sea.

In the ocean, east of the Kurile trough a one-layer basaltic crust is indicated thinly covered by sediments.

The DSS results are in good agreement with the gravimetric data.